



## Incidence of hernia affections & its treatment in the animals referred to Al-Muthanna Veterinary Hospital

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### Abstract

#### *This study was conducted*

on twenty-three clinical cases to determine the prevalence of external hernias in ruminants at AL-Muthanna Veterinary Hospital (13 sheep, 5 goats, and 5 cattle) between October 2018 and April 2019. Average age, sheep, and goats 1 month to 2 years and cattle 2 - 4 months. These animals had abdominal

(sheep = 2, goat = 3), umbilical (sheep = 8, goat = 2, cattle = 5), inguinal (sheep = 2) and scrotal (sheep = 1) hernias. The histories of the cases indicated that the hernias were noticed at 10 days to up to several months before presentation to the hospital. The sheep were 4 males and 9 females, goats were 1 male, and 4 females and cattle were 3 males and 2 females. The animals were placed on a dorsal position for umbilical and ventral midline hernias or lateral position for inguinal, scrotal (with an upward elevation of the uppermost hind limb of the affected side), ventrolateral and para-costal hernias. Sedation may be required in anxious cows. Xylazine Hydrochloride 0.03 to 0.1 mg/kg IM, is the most widely used sedative in ruminant practice. Techniques for local anesthesia using Lidocaine Hydrochloride 2% solution with linear subcutaneous infiltration at the site of the incision or circular infiltration around the base of the swelling.

In conclusion, this study described the clinical and surgical findings, which include the size of the hernial rings, the reducibility of the contents, the condition of the peritoneum, suture patterns, and materials used. The present study confirmed that the umbilical hernia usually occurred in ruminants due to the failure to close the umbilical cord, infection, and trauma. Also, a high incidence of hernias was recorded in females.

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### Introduction

A hernia is defined as the protrusion of the contents of a body cavity through a normal or abnormal opening in the wall of that cavity either to lie beneath the intact skin or to occupy another adjacent body cavity. In most of the abdominal hernias, the parietal peritoneum covers the herniated structure and is called the hernial sac, which protrudes through the hernial ring (Malangoni and Rosen, 2007).

Congenital umbilical hernias are of concern for heritability, although many umbilical hernias are secondary to umbilical sepsis. Multiple births and shortened gestation lengths are two important risk factors for congenital umbilical hernias in calves (Herrmann *et al.*, 2001). These are probably the result of a polygenic threshold character, passively involving a major gene whose expression is mediated by the breed background. Sire and umbilical infections are associated with the risk of an umbilical hernia in calves during the first 2 months of life (Steenholdt and Hernandez 2004). Hernias may be small at birth and gradually enlarge with age. The contents of an umbilical hernia are usually fat, omentum, and, in some larger hernia, segments of small intestines. In cattle, large umbilical hernias are not uncommonly seen (Virtala 1996). They develop from improper closure of the umbilicus at birth due to the developmental anomaly or hypoplasia of the abdominal muscles or from manual breaking or resection of the cord close to the abdominal wall (Turner and McIlwraith 1989). Several methods for hernial treatment have been described. Ligation of the hernial sac, use of clamps, suturing of the hernial sac, and radical operation are normally performed to correct the umbilical hernia, although open herniorrhaphy is the most common method of veterinary treatment. Despite its common use, open method of herniorrhaphy has many demerits, especially bacterial infection that might cause recurrence of the hernia. Whether closed herniorrhaphy can minimize these postoperative complications is unclear, although for an irreducible umbilical hernia, there is no choice other than open herniorrhaphy (O'Connor 1980).

Sutradhar *et al.*, (2009) described hernia as a protrusion of the contents of a body cavity through a weak spot of the body wall. This may accrue by accident or due to normal anatomical opening, which does not completely fulfill its physiological function. So a part of an internal organ bulges through a weakened muscle, tissue, or membrane that would normally contain it. Hernias are caused by a combination of muscle weakness and strain.

Anatomically Hernia consists of three parts, Hernial Ring, Hernial Sac, and Contents. (Amresh, 2009) In cattle's most common site of a hernia is the abdominal wall, which consists of the muscles and ligaments, which act as a shield and the natural function of it carrying the abdominal contents, mainly the intestines. When any weakness extends in the abdominal wall, the shield loses his job and form a hole which called hernial ring, then part of the viscera of the abdominal cavity passes through the hole and then bulging which is visible on the skin as a hernia (Singh *et al.*, 2014). The hernia either occurs when there is a natural weakness in the inguinal canal, and femoral or the umbilicus area caused wide in this canal and passing of viscera through it (Kumar *et al.*, 2013). There are different types of hernia depending on its condition and as follow:

- Reducible Hernia: This type can be manually or automatically return the hernial contents into the abdominal cavity.
- Irreducible Hernia: in this type, the hernial contents cannot be returned into the abdominal cavity. Therefore, the complication of this type are according to Kealy *et al.*, (2011):
  - A. Strangulation: In this type pressure of the contents of the hernia leads to cutting blood supplying and leads to Ischemia in the part of viscera that entering through the hernial ring and then necrosis may happening then Gangrene may accrue later and who becomes a mortal during 48-72 hours if

there is no surgical emergency.

- B. Obstruction: in this type, the ingesta be unable to transit through the canal of the digestive system due to blockage, which leads to the absence of defecation, which requires emergency surgical interference.

Moreover, hernias are classified according to its Location to:

- Umbilical Hernia

The umbilical hernia has been described as heredity in all species of animals; in cattle, most of them are small. Umbilical hernias in calves generally current in veterinary, which are causing due to failure of the normal closure of the umbilical ring, and which results in the projection of abdominal contents into the overlying subcutaneous. Either may happens when cutting the umbilical cord near the body or when animals chewed the umbilical cord or may be happened due to contaminated handling with the umbilical cord during cesarean section, leading to Omphalitis and weaknesses making them convertible to hernia ( Kumar *et al.*,2013; Westmore, 2014).

In general umbilical hernias can be divided into:

1. Uncomplicated hernias are those whose contents can be easily pushed back into the abdomen. 2. Strangulated hernias when contents cannot be easily pushed back into the abdomen, usually firm and may be painful to touch. The animal may show signs of colic and bloat and may die from the condition. 3. Umbilical hernias with an associated abscess comprise two distinct parts: the abscess component is a firm lump adhered to the skin, and the hernia is a softer swelling above this. Hernias with associated abscesses usually begin as an infected umbilicus alone (navel ill) ( Westmore, 2014).
2. Inguinal Hernia:  
Inguinal hernias are heredity or acquired result due to drooping abdominal viscera through a defect in the inguinal channel when animals are aged or extreme stress. In this type of hernia, part of the bowel may slip through the inner ring to the inguinal canal. It is common in males, as well as we can use X-rays to diagnose (Osman *et al.*, 2006).
3. Scrotal Hernia:  
The hernia marks as an extension of the inguinal hernia when viscera are reaching to scrotum through the internal and external Inguinal canal. The causes of this type of hernia are genetic or acquired, so it is best to hold the castration process Castration of defected animals (Roberts, 1988). In addition to the diagnosis of scrotal hernia in sheep and goats, physical examination, plain or contrast radiography and trans-scrotal ultrasonography can be used to this purpose (Abdin–bey and Ramadan 2001).
4. Femoral Hernia:  
Drooping part of the intestine through the passing region of the femoral vein and artery from the abdomen to the femora. This canal called the femoral canal. Diagnosis is this hernia by making the animal standing on hind limbs and feel the bulging ventrally to the inguinal ligament and laterally to Pelvic brim (Kumar *et al.*, 2013).
5. Incisional Hernia:  
This type happens, when ancient abdominal surgery has debilitated the abdominal wall or may cause infection at the surgical site causes a collapse of the wound closure (Bower *et al.*, 2004). So septic wounds after the operation,

which is the most dangerous predisposing factor and metabolic disorders such as weight gain and kidney deficit, diabetes, lack of protein or vitamin C and the use of some treatments, such as steroids and chemotherapy in addition to the increase in intra-abdominal pressure (Yahchouchy *et al.*, 2003, Klinge *et al.*, 2005).

6. Perineal Hernia:

This type of hernia is different from other types that the contents of the hernia don't cover by peritoneum, and partly due to the weakness of muscle of perineum, making it easier to droop some viscera of the abdominal and pelvic cavity. Usually, in Perineal, hernia animal has abdominal swelling and, in some cases, bilateral in perineal area is swollen (Padilla *et al.*, 1999; Shridhar, 2011).

7. Ventral Hernia:

A ventral hernia happens when the intestines project through the abdominal wall. A ventral hernia occurs as a result of external forces or trauma to the abdominal wall, weakening of the abdominal musculature or rupture of prepubic tendon. It is commonly seen along the costal arch, (Singh *et al.*, 2014). The diagnoses of the hernia made through the contents of the hernia and hernia ring be clear or palpated the viscera under the skin, but the diagnosis of Irreducible hernias defaulted and needed to use the X-ray to reflect the lack of abdominal wall continuity (Lund *et al.*, 2004; Abdin-bey and Ramadan, 2001). Exploratory laparotomy used to diagnosis the defect; X-ray used to differentiate abdominal wall hernias from fibrin-cystic, abscess, and inflammatory swellings in bovine animals (Muggli *et al.*, 2014, Kumar *et al.*, 2014).

8. Diaphragmatic Hernia:

A diaphragmatic hernia could be congenital or acquired. Diaphragmatic hernias are not seen clearly, and it must be expected that such natural defects are very rare in the horse. Accidental rupture usually occurs from abdominal defect, following a blunt wound or penetrating injuries to the abdomen cavity and chest. Frequently the clinical results at presentation include tiredness, respiratory complications, and exercise intolerance (De Schutter *et al.*, 2011). The most signs are tympany, depression, dullness, and scanty feces. The reticulum of all animals with the diaphragmatic hernia was located at the 4th/5th intercostal space by ultrasonography (Abdelaal *et al.*, 2014; Misk, 2015). Laparoscopically can be provided or could be used as a therapeutic technique according to the size and location of the defect. Necropsy or slaughter used to diagnose of diaphragmatic hernias (Sabev and Kanakov, 2009).

9. Epigastric Hernia.

This type of hernia mostly accrues at the linea alba region between xiphoid and umbilicus, happening due to facial defect. Also appear at different age, mostly with aggressive activity, chronic cough. The identification of the ligament trees and its accompanying vessel at its facial defect supports the vascular lacunae hypothesis. However, to further our understanding, a biopsy of the linea alba in patients with epigastric hernias is indicated (Lang and Lau, 2002).

Primary diagnosis of the hernia was made from the history and by palpation of the hernial region. The diagnosis of the cases, however, was confirmed by

exploratory puncture of the swelling and demonstration of intestinal contents. Detection of the hernial ring with the index finger also aided diagnosis. Either the reducibility of the continent after placed animal in dorsal recumbency and the contents were pushed back into the abdomen. In the case of reducible hernia, the contents went back to the abdominal cavity, and the hernial ring became evident (Salim *et al.*, 2015). Inguinal hernias are common in males, as well as we can use X-rays to diagnose (Osman *et al.*, 2006). Diagnosis of scrotal hernia in sheep and goats, physical examination, plain or contrast radiography, and trans-scrotal ultrasonography can be used to this purpose (Abdin-bey and Ramadan, 2001). Femoral Hernia diagnosis is this hernia by making the animal standing on hind limbs and feel the bulging ventrally to the inguinal ligament and laterally to Pelvic brim (Kumar *et al.*, 2013). Exploratory laparotomy used to diagnosis some cases. There are several ways to surgical treatment of hernia which depended on the size of hernial ring at the site, primary repair (Hernioraphy) a surgical treatment of simple hernia complete with sutures sited in a straight line in the abdomen, mesh repair (Hernioplasty) surgical repair, of large and complex hernia by using networks and may be use a laparoscope (Demirkiran *et al.*, 2003). Complex abdominal wall and hernia treatment use a mixture of primary and mesh (Whitfield *et al.*, 2011) Different types of surgical treatment of hernia are included:

1. A primary repair (Hernioraphy) a surgical repair of simple hernia done by suturing the site of the abdomen. However, Umbilical hernias, usually small and easily reducible when uncomplicated and smaller hernias may spontaneously resolve. Surgical repair specified for hernias when the diameter of the ring more than 3 cm. There are many ways of restoration have been used. Open reduction by increasing wound size, considered a result of high tension and causing vascular compromise at the surgical site, while Simple apposition was considered faster to healing. (Roberts, 2004) Both the absorbable or nonabsorbable materials were used to treat the umbilical herniorrhaphy. Absorbable sutures were used reasonably for young calves, while non-absorbable material used with elder calves to raise protection (Sutradhar *et al.*, 2009).
2. Repair by mesh (Hernioplasty) surgical repair of large and complex hernia by using networks and may be using a laparoscope (Demirkiran *et al.*, 2003). In large defects (greater than 10 cm) may need mesh in its place (Kumar *et al.*, 2013).
3. A combination of primary and mesh techniques are used to gather in compounding cases. Other types of complex repairs can include the use of tissue extension, transfer, and even transplantation. Surgical time, duration of hospitalization, and postoperative complications may be reduced by using this technique of primary repair and avoiding mesh implantation (Whitfield *et al.*, 2011). Review of literature revealed scarce publications concerning hernia in domestic animals. Therefore, this study was intended to study hernia to determine the prevalence of external hernias in ruminants at AL-Muthanna Veterinary Hospital (13 sheep, 5 goats, and 5 cattle) between October 2018 and April 2019.

## **Materials and methods**

### **Animals**

The study was carried out on twenty three clinical cases of ruminants at AL-Muthanna Veterinary Hospital (13 sheep, 5 goats and 5 cattle) between October 2018 and April 2019. Average age, ovine and caprine 1 month to 2 years and bovine 2 - 4 months. These animals had abdominal (sheep = 2, goat = 3), umbilical (sheep = 8, goat = 2, cattle = 5), inguinal (sheep = 2) and scrotal (sheep = 1) hernias. The histories of the cases indicated that the hernias were noticed at 10 days to up to several months before presentation to the hospital. The sheep were 4 males and 9 females, goats were 1 males and 4 females and cattle were 3 males and 2 females.

### **Preoperative preparation**

Included administration of antibiotics is strongly recommended. Commonly, mixture of penicillin streptomycin at a dose rate of 30,000 IU/kg for the penicillin and 10 mg/kg IM streptomycin for 5 days

### **Restraint**

The animals were placed on dorsal position for umbilical and ventral midline hernias or lateral position for inguinal, scrotal (with upward elevation of the uppermost hind limb of the affected side), ventrolateral and paracostal hernias.. with both fore legs and both hind legs tied separately.

### **Surgical preparation**

Clipping , shaving ,washing and antiseptic the operation site with povidone-iodine

### **Anesthesia**

Sedation may be required in anxious cows. Xylazine Hydrochloride 0.03 to 0.1 mg/kg IM (Knight, 1980), is the most widely used sedative in ruminant practice. Techniques for local anesthesia using Lidocaine Hydrochloride 2% solution with linear subcutaneous infiltration at the site of incision or circular infiltration around the base of the swelling.

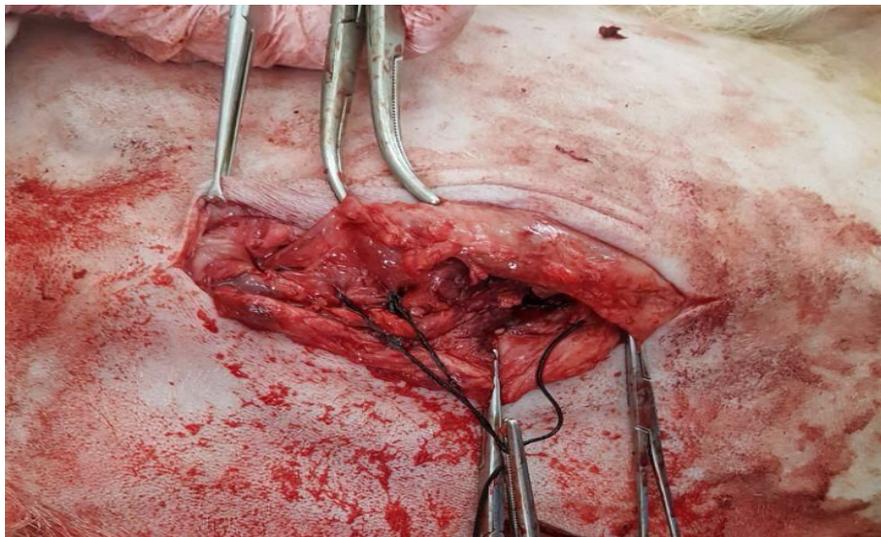
### **Surgical technique**

For umbilical, all ventral and inguinal hernias, a single linear skin incision was made through the center of the hernial sac, starting 2 cm beyond the anterior border of the hernia and extended for 2 cm posterior to it (Fig.1).



**Figure1. A single linear skin incision is made over the center of the hernial sac.**

For umbilical hernias in males, the posterior part of the skin incision was made lateral to the prepuce. For scrotal hernias a circular incision was made around the scrotal neck and extended up to the inguinal region of the affected side. The skin was bluntly dissected from the underlying tissues to expose and open the hernial sacs. The condition of the peritoneum (intact or teared) was recorded. All the adhesions between the hernial contents and the hernial sacs and/or the rings, if present, were freed gently. The herniated contents were examined and pushed into the abdominal cavity and the length of the rings was measured. The rings of larger umbilical hernias, inguinal hernias of mature animals, and all the ventral hernias were closed by intercepted horizontal matters suture(Fig.2) using nonabsorbable suture materials like No.2 silk.



**Figure2. Intercepted horizontal matters suture.**

The tissues overlying all the repaired rings, including the subcutaneous tissue, were sutured in a single or multiple layers (depending on the thickness of the abdominal wall at the surgical area) with simple continuous No2 chromic catgut. Excess skin was removed and skin wounds were closed using simple interrupted No.2 silk.

### **Post-operative care**

The success of the operation depends upon the post-operative care. Antibiotics and anti-inflammatory drugs given for 5 days. The operative site cleaned daily with oxy-spray. The sutures can be removed 8-10 days post-operative days. the animal should be fed on soft food for about 2 weeks after the operation to minimize pressure on the site of incision.

### **Results and Discussion**

The sheep in the present study had 4 types of hernias; abdominal = 2, umbilical = 8, inguinal = 2 and scrotal = 1. The size of the hernial ring ranged from a finger breadth up to more than 2-hands breadth. All the cases were reducible hernias except for 3 cases that had a non-reducible abdominal hernia. Two kids had umbilical abscesses along with their umbilical hernias

Hernias in the goats were 3 abdominal and 2 umbilical hernias. The size of the hernial ring ranged from 3 fingers breadth up to 2-hands breadth. All cases were reducible hernias.

Hernias in the cattle were 5 umbilical. The size of the hernial ring ranged from 3-5 fingers. All the cases were reducible hernias except for 2 cases that had a non-reducible abdominal hernia. one kids had umbilical abscesses along with their umbilical hernias.

Hernias may be congenital or acquired; they may occur as isolated defects or they may be associated with defects of other parts of the body. The results of the present study indicated that there were congenital umbilical hernias in sheep and goats, and these appeared just after birth; however, all the abdominal, inguinal and scrotal hernias in this study appeared to be acquired. Trauma due to horning from other animals appeared to be the most common cause of abdominal hernias. The abdominal wall of a goat is relatively thin. Muscle tearing and separation often occur from blunt trauma during shearing, fighting or crowding through narrow doorways. Trauma or extreme abdominal distention in sheep occasionally leads to rupture of the ventral abdominal muscles caudal to the umbilicus. The success rates of surgical treatment for all types of hernias were very high (Smith and Sherman,1994).

The umbilicus in newborn calves consists of the urachus (a tube that attaches the fetal bladder to the placental sac) and the remnants of the umbilical vessels that transport blood between the fetus and its mother. Normally, just after birth these structures shrink until only tiny remnants remain within the abdomen (belly). If the area in the body wall through which these structures passed remains open, abdominal contents can protrude through the defect resulting in an umbilical hernia (Al-Sobayil and Ahmed AF, 2007). Hernia size varies depending on the extent of the umbilical defect and the amount of abdominal contents contained within it. Umbilical hernias are the most common birth defects in calves, especially in Holstein-Friesians (Steenholdt and Hernandez,2004). The etiology of umbilical hernias likely has a genetic component (Distl *et al.*, 2002); however, excess traction on an oversized fetus or cutting the umbilical cord too close to the abdominal wall are other possible causes. Many umbilical hernias are secondary to umbilical sepsis (Steenholdt and Hernandez,2004).

Females showed a higher incidence of hernia than males. Similar findings have been reported previously (Müller *et al.*,1988), but are contradictory to other results (Herrmann *et al.*,2001).

Scrotal hernia in small ruminants is a rare disorder (ROBERTS, 1988), although inguinal hernia is relatively common in bulls, boars and rams (AL-SOBAYIL and AHMED, 2007). Inguinal hernia develops when loops of intestine or other abdominal organs protrude through an enlarged inguinal ring into the inguinal canal. When the protrusion of abdominal organs extends into the scrotum, a scrotal hernia is formed (St JEAN, 1995). However, scrotal hernia is rare because the anatomic narrowing of the vaginal tunic within the neck of the scrotum normally prevents the bowels from descending into the scrotum (GILBERT and FUBINI, 2004). An enlarged inguinal ring predisposes rams to the development of both inguinal and scrotal hernia ( SMITH, 2006 ).

## **Conclusions**

The preset study confirm that the umbilical hernia usually accrue in ruminants due to failure to closed of the umbilical cord , infection and trauma . Also high incidence of hernias were recorded in females.

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